Notice of Allowability	Application No.	Applicant(s)	
	10/071,596	MEECE ET AL.	
	Examiner	Art Unit	
	Erica E Cadugan	3722	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *appeal brief of Oct. 2004 and interview of Jan. 2005*.

2. ☒ The allowed claim(s) is/are *1-20*.

3. ☒ The drawings filed on *08 February 2002* are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Kurt on Ehresman on January 13, 2005.

2. The application has been amended as follows:

Claim 20. (Currently Amended) A method for cutting a hole of a hole size in a composite material workpiece, the method comprising the steps of:

providing a ceramic-matrix composite material workpiece having fibers embedded in a brittle ceramic matrix;

selecting a milling cutter having an effective cutter size less than the hole size;

mounting the composite material workpiece in operable relation to the milling cutter wherein the step of mounting includes the steps of

providing a backing fixture, and

affixing a back face of the composite material workpiece to the backing fixture;

rotating the milling cutter about an axis of rotation; and

advancing the milling cutter longitudinally into the composite material workpiece parallel to the axis of rotation at a rate of longitudinal advance from a front face of the composite material workpiece toward the back face, while laterally moving the milling cutter perpendicular

to the axis of rotation to interpolate the hole, and while maintaining the hole substantially flat-bottomed as the milling cutter advances.

Claim 21 has been canceled.

3. The following is an examiner's statement of reasons for allowance:

The previous rejections of claims 1-19 and 21 under 35 USC 112, first paragraph and of claims 1-21 under 35 USC 112, second paragraph are withdrawn. Between the explanation of the inventive method(s) described in at least paragraphs 0028-0030 of the specification and the assertion by Applicant that the terms "substantially flat bottomed", "substantially a constant depth", and "brittle" are to be interpreted based on their conventional meanings (see page 8 of the appeal brief received 10/28/04, the paragraph beginning "[t]he words that make up the phrases used in the claims...", and pages 10-11 of the same appeal brief, the paragraph beginning "[t]here is a further sec. 112 rejection asserting that 'brittle'...", for example), such as the meanings explicitly provided by Applicant as being those conventional meanings, Examiner is persuaded that the use of these terms in the specification and claims is clear.

The previous rejections of the claims over the prior art are withdrawn.

Specifically, for example, base reference U.S. Pat. No. 5,641,252 to Eriksson et al., used in previous art rejections of the claims, is considered to be a representative example of the closest prior art of record to the present invention as set forth in the independent claims.

Eriksson teaches a method for producing a hole in a fiber-reinforced composite material workpiece wherein the material is machined "simultaneously in both an axial and a radial sense by causing the tool to describe an axial motion and to rotate not only about its own axis (5), but also eccentrically about the central axis" (see abstract, for example, and col. 5, lines 5-19, for

example). However, Eriksson is silent about the rate of longitudinal advance of the cutter while performing the described "axial motion", and thus does not expressly teach that the milling cutter is advanced at a rate of longitudinal advance "while maintaining the hole substantially flat bottomed as the milling cutter advances" as set forth in independent claim 1, and as now set forth in independent claim 20, nor that the milling cutter is advanced at a rate of longitudinal advance "such that the hole has a substantially constant depth over its entire area as it is cut" as set forth in independent claim 11.

Thus, Eriksson does not anticipate the present invention as set forth in the independent claims.

Additionally, the Tool and Manufacturing Engineers Handbook, Vol. 1, Machining (hereinafter "Handbook") was relied upon in the previous prior art rejections to overcome the deficiencies of the aforedescribed prior art, and is representative of the closest prior art of record for such a teaching. As described previously in the final rejection mailed 1/26/04, for example, Handbook teaches that the feed rate in a milling machine is determined based on a number of factors, such as the material of the workpiece, for example (specifically, page 10-116 mentions that the machinability of the material, its physical properties, and its condition, for example, must be factored into the selection of parameters for any milling operation, which parameters include feed rate, see the first two paragraphs of page 10-116). Additionally, Handbook explicitly teaches that in general, "lower feeds are needed for cutting harder materials" (page 10-60, right column, lines 5-7, for example). Additionally, Handbook provides a table (Table 10-8), including various feed rates to try with various materials, the materials including a wide variety of metals, as well as plastics and wood. Examiner noted in the aforedescribed rejections that all

of the feed rates listed would create an advance of the tool wherein the tool is only advanced at most a few thousandths of an inch at a time, which would appear to create a hole that remains "substantially flat-bottomed" as cut.

The rejections in question then stated that it would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilized one of the specific "lower feeds" taught by the teachings of Handbook to have machined the harder "composite material" claimed by Applicant and taught by Eriksson, for example, for the purposes of maintaining a maximum cutting life of the tool (as indicated on pages 10-53 and 10-60 of Handbook), thus saving cost and also saving time by decreasing the amount of time that is spent changing tools.

However, as pointed out by Applicant on at least page 12 of the aforedescribed appeal brief, "Handbook offers prime examples of the 'traditional' approaches used in milling (not even hole forming), and there is no reason to believe that they are applicable to the cutting of holes in composite materials". Specifically, the milling operation claimed by Applicant is something of a hybrid operation of drilling and milling, which Examiner concedes would likely have a different set of parameters than the parameters utilized in a pure milling operation as described in Table 10-8, for example. Examiner also concedes that Handbook does not provide any guidance for any parameters to utilize when milling "composite" materials as claimed in the independent claims. Examiner further concedes that the cutting of "composite materials" is different than just the provision of a "harder" material than the metals (or plastic or wood) specifically described by Handbook (in the context of "harder material" equals reduced feed as described above), but instead provides a different set of machining circumstances since the provision of multiple

materials that each retain their own properties (as occurs in a composite) causes different reactive forces, for example, between the workpiece and tool than for a single-material workpiece. Note that Merriam-Webster's Collegiate Dictionary, 10th ed. defines a composite material as a "solid material which is composed of two or more substances having different physical characteristics and in which each substance retains its identity while contributing desirable properties to the whole; *esp:* a structure material made of plastic within which a fibrous material (as silicon carbide) is embedded". Thus, the different physical characteristics of the materials forming the composite, as well as the properties held by the composite material as a whole, would have to be taken into account when determining a feed to use for a "composite" material, which Handbook does not address.

Thus, to combine the teachings of Handbook with the teachings of Eriksson to arrive at the presently-claimed invention would require the use of impermissible hindsight to first modify the teachings of Handbook (before applying them to Eriksson), since Handbook is providing feed guidelines for a different type of machining operation (face milling as shown in Figure 10-78) than for the hybrid drilling/milling operation of the present claims, and since Handbook does not provide any feed guidelines for the selection of a feed for a composite material.

Additionally, there is no other combinable teaching in the prior art of record that would reasonably motivate one having ordinary skill in the art to so modify the teachings of Eriksson, and thus, for at least the foregoing reasoning, the prior art of record does not render obvious the present invention as set forth in independent claims 1, 11, and 20.

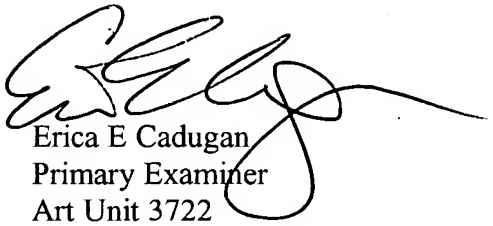
4. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erica E Cadugan whose telephone number is (571) 272-4474. The examiner can normally be reached on M-F, 7:30 a.m. to 5:00 p.m., alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrea L. Wellington can be reached on (571) 272-4483. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Erica E Cadugan
Primary Examiner
Art Unit 3722

eec
January 18, 2005